

# In-Space Distributed Fiber Optic Hydrogen Leak Sensor, Phase II



Completed Technology Project (2009 - 2011)

## Project Introduction

Broadband Photonics Inc. proposes development of a patent-pending distributed fiber optic sensor for in-space hydrogen leak detection. Reliable and fast detection of hydrogen leaks is critical to both operational safety and maintenance of propellant quantities for in-space hydrogen systems. Characteristics of the plume formed by a hydrogen leak are unpredictable in low gravity due to lack of buoyancy effects. The proposed hydrogen fiber sensor can detect any flow direction of a hydrogen leak, determine the leak location, and measure hydrogen concentration. The fiber sensor can also detect hydrogen leaks from unexpected locations in space vehicles caused by stress-induced tiny cracks or other various damages. The proposed sensor will have the same fast response speed and high sensitivity in cryogenic environments as in room temperature. Furthermore, the proposed fiber sensor offers several significant advantages, including reconfigurable, lightweight, one feed-through, easy installation, easy maintenance, and capability of working in radiation harsh environments. In Phase 1, feasibility work has been performed. In Phase 2, prototypes of the proposed hydrogen fiber sensor will be produced for field trial and be prepared for commercialization in Phase 3.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Kennedy Space Center (KSC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Broadband Photonics Incorporated	Supporting Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Winchester, Massachusetts

Primary U.S. Work Locations	
Florida	Massachusetts

## Project Transitions

-  **September 2009:** Project Start
-  **June 2011:** Closed out

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX14 Thermal Management Systems
  - └ TX14.1 Cryogenic Systems
    - └ TX14.1.2 Launch Vehicle Propellant